"On the Cytological Features of Fertilisation and related Phenomena in *Pinus silvestris*, L." By VERNON H. BLACKMAN, B.A., F.L.S., Hutchinson Student, St. John's College, Cambridge, and Assistant, Department of Botany, British Museum. Communicated by FRANCIS DARWIN, F.R.S. Received May 3,—Read May 26, 1898.

(Abstract.)

This paper gives a fairly complete account of the minute cytological details of the act of fertilisation and of the processes surrounding it, from the formation of the ventral canal cell up to the period of cell-wall formation at the base of the egg.

As the oosphere nucleus, after separation of the nucleus of the ventral canal cell, moves rapidly back towards the centre of the egg, it increases greatly in size, as described by Strasburger. This increase in size is shown to be due to the appearance in the nucleus of a peculiar metaplasmic substance, which fills up the nucleus, and, owing to its attraction for stains, ultimately obscures the chromatin. The mature female nucleus, which is sometimes large enough to be visible to the naked eye, exhibits merely an uniformly staining reticulum composed chiefly of metaplasmic substance, with one or more nucleoli.

By the rupture of the closing membrane of the well-marked pit at the apex of the pollen tube, almost the whole of the contents of the lower part of the tube pass over into the oosphere. At this stage all the four nuclei, together with a considerable number of starch grains from the pollen tube, are to be seen lying in the cytoplasm of the egg. Cytoplasm from the pollen tube must also necessarily pass over, and with it the plastid-like structures to be seen earlier in the cytoplasm of the generative cells.

The behaviour of the four nuclei in the egg was carefully followed; the stalk cell nucleus, the pollen tube nucleus, and one generative nucleus remain at the apex of the egg, near the point of entry, and ultimately become disorganised. The other generative nucleus, which possesses distinct nucleoli, as does also its sister nucleus, advances very rapidly towards the female nucleus, increasing somewhat in size and in mass of staining material on its way. After coming in contact with the much larger female nucleus it gradually penetrates the substance of the latter until it is almost completely enclosed within it, but breaking down of the nuclear walls, that is, actual fusion, is for some time delayed. After fusion has taken place, but while the outlines of the two nuclei are still distinct, the chromosomes can be distinguished as two separate groups derived

from the male and female nuclei respectively. Indications of the first segmentation spindle are also to be observed at this stage as fine staining threads running throughout both nuclei. No definite resting fertilised nucleus is formed.

The spindle, which lies obliquely in the centre of the egg, is at first multipolar in form, and while it is in this condition the chromosomes begin to split longitudinally, but can still be distinguished roughly into two groups.

Only after the formation of four segmentation nuclei do these begin to wander down to the base of the egg. On its way down each nucleus has a distinct sheath of cytoplasmic fibres, but when it reaches the base these become replaced by fine cytoplasmic threads, which run from the nucleus out into the general cytoplasm. These later-formed cytoplasmic threads seem to be connected with the formation of cell walls around the nuclei.

The number of chromosomes in the egg nucleus was determined by counting them in the division which cuts off the ventral canal cell, and was found to be twelve. The same number was also to be found in the nuclei of the cells of the prothallial tissue and of the pollen mother cells. The chromosomes of the first segmentation spindle, on the one occasion on which they could be counted, were exactly twenty-four in number. The chromosomes were also counted in several types of sporophytic tissue; at least twenty-one chromosomes could always be observed; presumably twenty-four are always present.

No centrospheres or centrosomes were to be seen in connection either with fertilisation or with any of the related processes.

"Experiments on Aneroid Barometers at Kew Observatory and their Discussion." By C. CHREE, Sc.D., LL.D., F.R.S., Superintendent. Received May 5,—Read June 9, 1898.

(Communicated by the Author at the request of the Kew Observatory Committee.)

(Abstract.)

The paper deals with two species of data. The first consists of particulars derived from the records at Kew Observatory as to the errors observed in about 300 aneroid barometers. These had been subjected to the ordinary Kew test, which consists in lowering the pressure to which the aneroid is exposed inch by inch to the lowest point at which verification is desired, and raising the pressure in a corresponding way to its original value. Readings are taken at each inch of pressure during both the fall and the recovery, and a table of corrections is obtained by reference to the corresponding readings of a mercury gauge.